

REMARKS

This application has been reviewed in light of the Office Action dated September 12, 2008. Claims 1-10 are now pending in the application. The Specification has been amended to correct typographical errors. Claims 3-9 have also been amended. No new matter has been added. The Examiner's reconsideration of the rejection in view of the following remarks is respectfully requested.

Objections to the Specification

By the Office Action, the disclosure has been objected to for various typographical errors. The Applicant notes with appreciation the Examiner's indication of the errors. The Specification has been amended in a way believed to overcome the objection. No new matter has been added. Similarly, claim 8 has been amended in an identical manner to correct the same corresponding typographical errors. Accordingly, withdrawal of the objection is respectfully requested.

Objections to the claims

By the Office Action, claim 9 has been objected to for being optionally dependent on claim 1. The claim has been amended in a way believed to overcome the objection. Accordingly, withdrawal of the objection is respectfully requested.

Rejections of claims under 35 U.S.C. §112

By the Office Action, claims 3-10 stand rejected under 35 U.S.C. §112. The claims have been amended in a way believed to overcome the rejection. Accordingly, withdrawal of the rejection is respectfully requested.

Rejections of claims under 35 U.S.C. §102(b)

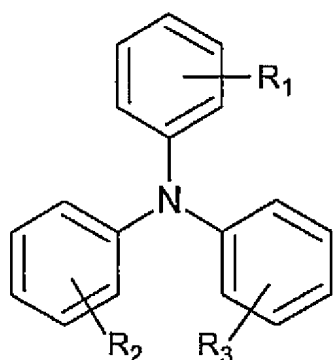
By the Office Action, claims 1-7, 9 and 10 stand rejected under 35 U.S.C. §102(b) as being anticipated by U.S. Patent Publication No. 2002/0094452 (hereinafter 'Ueda').

Claim 1 recites:

A conductor material for LEDs for improving the light outcoupling, wherein the conductor material is selected from the group comprising hole conductor material, electron conductor material and/or emitter material, the conductor material comprises at least one conductive fluorinated organic substance having at least one fluorinated alkyl substituent, one fluorinated alkenyl substituent and/or one fluorinated alkynyl substituent, wherein at least two fluorine atoms are bonded to at least one carbon atom of the fluorinated substituent, and the conductive fluorinated organic substance has a refractive index of ≥ 1.30 and ≤ 1.55 .

In support of the rejection of claim 1, the Examiner has stated that Ueda discloses compounds that inherently have an index of refraction between the ranges recited in claim 1 because they are within a formula described in the Specification as having the claimed index of refraction property. Specifically, the Examiner has asserted that Ueda discloses compounds that are within formula XIX, which has been claimed in claim 7. The Applicant respectfully disagrees.

As noted in the Specification and in claim 7, formula XIX includes the following:



Formula XIX

in which R1, R2, R3, R4, R5, R6, R7, R8 and R9 are at least partially identical or different and are selected from the group comprising hydrogen, hydroxyl, alkyl, alkenyl, alkynyl, alkoxy, aryl, alkylene, arylene, amines, halogen, carboxylate derivatives, cycloalkyl, carbonyl derivatives, heterocycloalkyl, heteroaryl, heteroarylene, sulfonate, sulfate, phosphonate, phosphate, phosphine and/or phosphine oxide, wherein at least one R1, R2, R3, R4, R5, R6, R7, R8 and/or R9 represents a fluorinated alkyl substituent, a fluorinated alkenyl substituent and/or a fluorinated alkynyl substituent in which at least two fluorine atoms are bonded to at least one carbon atom; and

in which $n = 1$ to 10,000,000.

While Ueda discloses compounds that are similar to formula XIX, it is respectfully submitted that the compounds described in Ueda do not anticipate formula XIX. For example, the Examiner has stated that compounds 22-29 and compounds 39-41 of Ueda conform to formula XIX. As provided in formula XIX, besides the bond to the nitrogen atom, each “benzene” ring in the formula is bonded to only one other group, an “R” group, such that at least one of the “R” groups is fluorinated. In compound 22 of Ueda (Ueda, p. 9), although each “benzene” ring neighboring the nitrogen atom has a fluorinated alkyl substituent (CF_3), the neighboring “benzene” rings are bonded to additional methyl groups and “benzene” rings. Thus, compound 22 does not anticipate formula

XIX because each “benzene” ring neighboring the nitrogen atom in compound 22 does not have only one bonded group besides the nitrogen bond. Furthermore, the neighboring “benzene” rings of compounds 23-29 and 39-41 each similarly include additional groups besides a fluorinated group and the nitrogen bond.

Accordingly, Ueda does not disclose a compound that anticipates formula XIX. In addition, Ueda seemingly does not disclose any compound that anticipates a formula of a material that has a refractive index of ≥ 1.30 and ≤ 1.55 . Thus, claim 1 is believed to be patentable over Ueda at least because Ueda does not disclose or render obvious a fluorinated compound that has an index of refraction of ≥ 1.30 and ≤ 1.55 . Moreover, claims 2-7, 9 and 10 are believed to be patentable over Ueda due at least to their dependencies from claim 1. As such, withdrawal of the rejection is respectfully requested.

By the Office Action, claims 1-7, 9 and 10 stand rejected under 35 U.S.C. §102(b) as being anticipated by U.S. Patent Publication No. 2002/0106531 (hereinafter ‘Naito’).

Claim 1 recites:

A conductor material for LEDs for improving the light outcoupling, wherein the conductor material is selected from the group comprising hole conductor material, electron conductor material and/or emitter material,

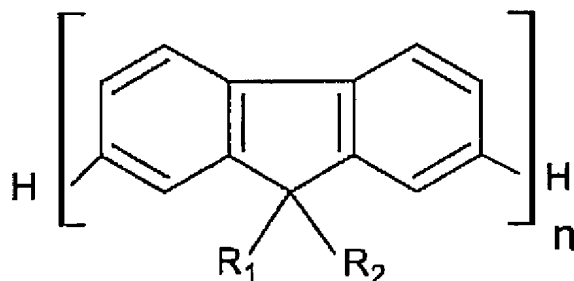
the conductor material comprises at least one conductive fluorinated organic substance having at least one fluorinated alkyl substituent, one fluorinated alkenyl substituent and/or one fluorinated alkynyl substituent, wherein at least two fluorine atoms are bonded to at least one carbon atom of the fluorinated substituent, and

the conductive fluorinated organic substance has a refractive index of ≥ 1.30 and ≤ 1.55 .

In support of the rejection of claim 1, the Examiner has stated that Naito discloses

compounds that inherently have an index of refraction between the ranges recited in claim 1 because they are within a formula described in the Specification as having the claimed index of refraction property. Specifically, the Examiner has asserted that Naito discloses compounds, H9, that are within formula XX, which has been claimed in claim 7. The Applicant respectfully disagrees.

As noted in the Specification and in claim 7, formula XX includes the following:



Formula XX

in which R1, R2, R3, R4, R5, R6, R7, R8 and R9 are at least partially identical or different and are selected from the group comprising hydrogen, hydroxyl, alkyl, alkenyl, alkynyl, alkoxy, aryl, alkylene, arylene, amines, halogen, carboxylate derivatives, cycloalkyl, carbonyl derivatives, heterocycloalkyl, heteroaryl, heteroarylene, sulfonate, sulfate, phosphonate, phosphate, phosphine and/or phosphine oxide, wherein at least one R1, R2, R3, R4, R5, R6, R7, R8 and/or R9 represents a fluorinated alkyl substituent, a fluorinated alkenyl substituent and/or a fluorinated alkynyl substituent in which at least two fluorine atoms are bonded to at least one carbon atom; and

in which $n = 1$ to 10,000,000.

Although Naito discloses use of a polyfluorene with two fluorinated butyl substituents at the 9-position (see Naito, H9, p. 4) as a host molecule, it is respectfully submitted that the disclosure does not anticipate formula XX. In formula XX, each fluorene substituent is consistently bonded to the same R₁ and R₂ groups. Furthermore, the end groups of the molecule or polymer are hydrogen

atoms. Naito does not disclose a conductive material substance that anticipates formula XX. Rather, Naito teaches that H9 is doped with a luminescent dye molecule (see, e.g., Naito, para. 16 and para. 32). Thus, H9 does not anticipate formula XX, as H9 cannot conform to a consistent polyfluorene with consistent R1 and R2 groups at the 9-position and with hydrogen as end groups. Accordingly, Naito does not disclose a conductive material substance that anticipates formula XX. In addition, Naito seemingly does not disclose any conductive material substance that anticipates a formula of a material that has a refractive index of ≥ 1.30 and ≤ 1.55 . Thus, claim 1 is believed to be patentable over Naito at least because Naito does not disclose or render obvious a fluorinated compound that has an index of refraction of ≥ 1.30 and ≤ 1.55 .

Furthermore, with regard to the Examiner's reference to Naito's disclosure of fluorinated alkyl substituents with a general formula of C_mF_{m+x} , it should be noted that the Applicant has not asserted that every molecule or polymer with a fluorinated substituent has a refractive index of between 1.30 and 1.55. Rather, the Specification states that aspects of the present principles are directed to conductive fluorinated organic substances with a refractive index of ≥ 1.30 and ≤ 1.55 that simply include fluorinated substituents. As discussed in the Specification, implementations of the present principles are directed to improving the outcoupling efficiency of light for LED devices over prior art systems. Examples of organic light emitting materials of prior art systems explicitly referred to in the Specification include a compound having fluorinated alkyl substituents, $CF_3-CPh_2-CF_3$. In addition, the Specification notes that prior art systems typically have organic LED materials with a refractive index of 1.7 and have a poor outcoupling efficiency of up to a maximum of 50%. In addressing the deficiencies of known prior art substances, the Specification notes

It has now surprisingly been found that a conductor material layer based on conductive fluorinated organic substances having a refractive index of ≥ 1.30 and \leq

1.50 outcouples generated light considerably better than conductor material layers consisting of substances having a higher refractive index, with the outcoupling of light increasing as the refractive index of the conductive fluorinated organic substances according to the invention in the light-emitting layer decreases. Consequently, conductive fluorinated organic substances which have a refractive index of ≥ 1.30 and ≤ 1.50 . . . are particularly suitable.

(Specification, p. 2, lines 18-26) (emphasis added). Accordingly, the Applicant has not stated all substances with fluorinated alkyl substituents have a refractive index of ≥ 1.30 and ≤ 1.55 . Moreover, it is clear to one of ordinary skill in the art that all molecules or polymers with a fluorinated alkyl substituent do not necessarily possess a refractive index of ≥ 1.30 and ≤ 1.55 simply because they have a fluorinated alkyl substituent. Thus, Examiner may not rely on a disclosure of a fluorinated alkyl substituent as anticipating the feature of a conductive fluorinated organic substance that has a refractive index of ≥ 1.30 and ≤ 1.55 .

Therefore, claim 1 is believed to be patentable over Naito for at least the reasons stated. Moreover, claims 2-7, 9 and 10 are believed to be patentable over Naito due at least to their dependencies from claim 1. As such, withdrawal of the rejection is respectfully requested.

By the Office Action, claims 1-6, 9 and 10 stand rejected under 35 U.S.C. §102(b) as being anticipated by U.S. Patent Publication No. 2003/0091861 (hereinafter 'Okada').

Claim 1 recites:

A conductor material for LEDs for improving the light outcoupling, wherein
the conductor material is selected from the group comprising hole conductor material, electron conductor material and/or emitter material,

the conductor material comprises at least one conductive fluorinated organic substance having at least one fluorinated alkyl substituent, one fluorinated alkenyl substituent and/or one fluorinated alkynyl substituent, wherein at least two fluorine atoms are bonded to at least one carbon atom of the fluorinated substituent, and

the conductive fluorinated organic substance has a refractive index of ≥ 1.30 and ≤ 1.55 .

In support of the rejection of claim 1, the Examiner has stated that Okada discloses compounds that inherently have an index of refraction between the ranges recited in claim 1 because they are within a formula described in the Specification as having the claimed index of refraction property. Specifically, the Examiner has asserted that Okada discloses compounds that have a fluorinated alkyl substituent of the general formula C_mF_{m+X} . However, as discussed above, the Specification does not state that all molecules or polymers with one or more fluorinated substituents have a refractive index of between 1.30 and 1.55. Furthermore, it is clear to one of ordinary skill in the art that not all molecules or polymers with one or more fluorinated substituents has a refractive index of between 1.30 and 1.55. Accordingly, the Examiner may not rely on a disclosure of a fluorinated alkyl substituent as anticipating the feature of a conductive fluorinated organic substance that has a refractive index of ≥ 1.30 and ≤ 1.55 . In addition, Okada seemingly does not disclose any conductive material substance whatsoever that anticipates a formula of a material that has a refractive index of ≥ 1.30 and ≤ 1.55 .

Thus, claim 1 is believed to be patentable over Okada for at least the stated reasons. Moreover, claims 2-6, 9 and 10 are believed to be patentable over Okada due at least to their dependencies from claim 1. As such, withdrawal of the rejection is respectfully requested.

Rejections of claims under 35 U.S.C. §103(a)

By the Office Action, claim 7 stands rejected under 35 U.S.C. §103(a) as being unpatentable over Okada in view of U.S. Patent Publication No. 2002/0028329 (hereinafter 'Ise').

In support of the rejection of claim 7, the Examiner has stated that Okada discloses aryl

compounds with benzoimidazole derivatives with carbon of the benzene ring replaced by nitrogen. In addition, the Examiner has stated that Okada does not disclose an aryl compound with benzoimidazole derivatives with no additional nitrogen atoms (116). To cure the deficiencies of Okada, the Examiner cites Ise, stating that because Ise teaches similar aryl compounds with benzoimidazoles with and without an additional nitrogen atom, one of ordinary skill in the art would conceive of using formula X recited in claim 7.

However, it is respectfully submitted that while Ise teaches that other aryl compounds with benzoimidazoles may be used with and without an additional nitrogen atom, Ise does not teach or remotely suggest that the fluorinated aryl compound 116 of Okada may be used without an additional nitrogen atom. Accordingly, one of ordinary skill in the art would not conceive of formula X as claimed in claim 7. As such, withdrawal of the rejection is respectfully requested.

By the Office Action, claim 8 stands rejected under 35 U.S.C. §103(a) as being unpatentable over Naito. In support of the rejection of claim 8, the Examiner has stated that Naito discloses a polyfluorene with two fluorinated butyl substituents in the 9-position, referencing H9 of Naito. In addition, the Examiner states that it would be obvious to one of skill in the art to employ fluorinated octyl groups as recited in claim 8, seemingly referring to formula XXVI, because fluorinated butyl groups and fluorinated octyl groups are homologs.

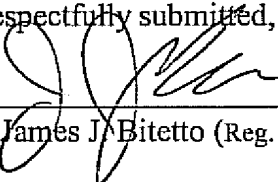
However, it is respectfully submitted that even if the fluorinated butyl substituents of H9 were replaced with fluorinated octyl substituents, the resulting substance would not anticipate formula XXVI. Similar to formula XX, discussed above, each fluorene substituent of formula XXVI is consistently bonded to the same octyl groups. Moreover, the end groups of the molecule or polymer are hydrogen atoms. As discussed above, Naito teaches that H9 is doped with a

luminescent dye molecule (see, e.g., Naito, para. 16 and para. 32). Thus, even if fluorinated butyl substituents were replaced with fluorinated octyl substituents in H9, the resulting substance would not anticipate formula XXVI, as the substance cannot conform to a consistent polyfluorene with consistent fluorinated octyl substituents at the 9-position and with hydrogen as end groups. Accordingly, Naito does not render obvious a conductive material substance that anticipates formula XXVI. In addition, Naito does not seemingly disclose or render obvious any other substance claimed in claim 8. Thus, claim 8 is believed to be patentable over Naito for at least the stated reasons. Withdrawal of the rejection is respectfully requested.

In view of the foregoing, the Applicants respectfully request that the rejections of the claims set forth in the Office Action of September 12, 2008 be withdrawn, that pending claims 1-10 be allowed, and that the case proceed to early issuance of Letters Patent in due course.

It is believed that no additional fees or charges are currently due. However, in the event that any additional fees or charges are required at this time in connection with the application, they may be charged to applicant's representatives Deposit Account No. 14-1270.

Dated: 12/5/08

Respectfully submitted,
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